

CLAIMS

What is claimed is:

1. A method for use in encoding and decoding a data set representing an image,
5 comprising:
 - a first subroutine for partitioning the data set into first and second sets, for adding the first set into a list of insignificant sets (LIS), and for initializing a list of significant pixels (LSP);
 - a second subroutine for testing the first and second sets for significance with
10 respect to a threshold value, partitioning significant members of the first and second sets in accordance with first and second partitioning functions, respectively, and adding significant pixels to the LSP;
 - a third subroutine for refining the quantization of the pixels in the LSP; and
 - a fourth subroutine for decrementing the threshold value,
- 15 wherein the second, third and fourth subroutines are repeated until encoding/decoding of the data set has been completed.
2. The method as recited in claim 1, wherein the fourth subroutine further comprises a routine for entropy coding a significance map generated in accordance with
20 the second and third subroutines.
3. The method as recited in claim 1, wherein members of the first set demonstrating significance with respect to the threshold value are partitioned employing a quadtree partitioning scheme.
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4. The method as recited in claim 3, wherein members of the first set demonstrating significance with respect to the threshold value are recursively partitioned employing a quadtree partitioning scheme.

5. The method as recited in claim 1, wherein members of the second set demonstrating significance are with respect to the threshold value partitioned employing octave band partitioning.

5 6. The method as recited in claim 5, wherein members of the second set demonstrating significance are with respect to the threshold value recursively partitioned employing octave band partitioning.

7. The method as recited in claim 2, wherein the subroutine for entropy coding is
10 performed using arithmetic coding.

8. The method as recited in claim 1, wherein the image comprises a sequence of images which vary over time.

15 9. The method as recited in claim 1, wherein the second, third and fourth subroutines are repeated until one of the encoding/decoding of the data indicative of the lowest bit plane has been completed and the bit budget has been spent.

10. A coder for use in encoding and decoding a data set corresponding to an image,
20 comprising:

first means for partitioning the subband transformation into first and second sets, for adding the first set into a list of insignificant sets (LIS), and for initializing a list of significant pixels (LSP);

second means for testing the first and second sets for significance with respect to
25 a threshold value, partitioning significant members of the first and second sets in accordance with first and second partitioning functions, respectively, and adding significant pixels to the LSP; and

third means for refining the quantization of the pixels in the LSP;

wherein said second and third means are employed seriatim as the threshold value is decremented until encoding/decoding of the data set has been completed.

11. The coder as recited in claim 10, further comprising:
 - 5 fourth means for entropy coding a significance map cooperatively generated by the second and third means.
12. The coder as recited in claim 10, wherein members of the first set demonstrating significance with respect to the threshold value are partitioned employing a quadtree
10 partitioning scheme.
13. The coder as recited in claim 10, wherein members of the second set demonstrating significance are partitioned employing octave band partitioning.
14. The coder as recited in claim 11, wherein the fourth means performs entropy coding using arithmetic coding.
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15. A recording medium storing computer readable instructions for converting a general purpose computer into a hierarchical image coder, wherein the image coder is a
20 low-complexity image coder which generates a selectively embedded bit stream suitable for progressive transmission.
16. The recording medium as recited in claim 15, wherein the computer readable instructions permit the general purpose computer to repeatedly store and release data
25 representing blocks of a image being encode to thereby permit the hierarchical image coder to process an image larger in size than available coder computer memory.

17. The recording medium as recited in claim 15, wherein the computer readable instructions permit the hierarchical image coder to perform both lossy and lossless compression.

5 18. The recording medium as recited in claim 15, wherein the computer readable instructions permit the hierarchical image coder to perform both lossy and lossless compression without sorting.

10 19. A recording medium storing computer readable instructions for converting a general purpose computer into a hierarchical image decoder, wherein the image decoder is a low-complexity image decoder which reconstructs an image from a selectively embedded bit stream transmitted by progressive transmission.

15 20. The recording medium as recited in claim 19, wherein the computer readable instructions permit the general purpose computer to repeatedly store and release data representing blocks of a image being decode to thereby permit the hierarchical image coder to reconstruct an image larger in size than available decoder computer memory.

20 21. The recording medium as recited in claim 19, wherein the computer readable instructions permit the hierarchical image decoder to reconstruct images from the selectively embedded bit stream irrespective of whether the selectively embedded bit stream represents either lossy or lossless compression.

25 22. The recording medium as recited in claim 21, wherein the computer readable instructions permit the hierarchical image decoder to perform both lossy and lossless compression without sorting.